

Claims

- [c1] A thermal control system for a light source of a vision system comprising:
 - a heater thermally coupled to the light source; and
 - a thermal sensor thermally coupled to the light source and generating a temperature signal;
 - a controller coupled to said heater and to said thermal sensor, said controller operating said heater when said temperature signal is below a temperature limit.
- [c2] A system as in claim 1 further comprising:
 - a cooling assembly having a cooling device and being thermally coupled to the light source; and
 - a controller coupled to said cooling assembly and operating said cooling device when said temperature signal is above a minimum temperature limit.
- [c3] A system as in claim 2 wherein said controller activates said cooling device before said temperature signal drifts above said minimum temperature limit.
- [c4] A system as in claim 2 wherein said cooling assembly comprises:
 - a cooling fan in thermal communication with said light

source;

said controller operating said cooling fan when said temperature signal is above said minimum temperature limit.

- [c5] A system as in claim 4 wherein said cooling assembly comprises:
 - a heat sink thermally coupled to said light source; and
 - an air sleeve thermally coupled to said heat sink and said cooling fan;said controller operating said cooling fan to circulate air across said heat sink.
- [c6] A system as in claim 5 further comprising a thermal coupler layer thermally coupled between said light source and said heat sink.
- [c7] A system as in claim 2 wherein said controller controls cooling output and activation duration of said cooling device.
- [c8] A system as in claim 2 wherein said controller controls an operating speed of said cooling device.
- [c9] A system as in claim 1 wherein said heater is activated before said temperature signal drifts below a heater deactivation zone.

- [c10] A system as in claim 1 wherein said controller controls thermal output and duration of said output of said heater.
- [c11] A vision system of a vehicle comprising:
an illuminator assembly having a light source and generating an illumination beam;
a thermal control system thermally coupled to said illuminator assembly;
a receiver assembly generating an image signal in response to at least a reflected portion of said illumination beam; and
at least one controller controlling generation of said illumination beam and said image signal and thermally controlling operating range of said light source.
- [c12] A vision system as in claim 11 wherein said illuminator assembly is configured to be mounted within the interior cabin of the vehicle.
- [c13] A vision system as in claim 11 wherein said receiver assembly is configured to be mounted within the interior cabin of the vehicle.
- [c14] A vision system as in claim 11 wherein said thermal control system comprises:
a heater thermally coupled to the light source; and

a thermal sensor thermally coupled to the light source and generating a temperature signal;
a controller coupled to said heater and to said thermal sensor, said controller operating said heater when said temperature signal is below a maximum temperature limit.

[c15] A system as in claim 11 wherein said thermal control system comprises:
a cooling assembly having a cooling device and being thermally coupled to the light source;
a thermal sensor thermally coupled to the light source and generating a temperature signal; and
a controller coupled to said cooling assembly and to said thermal sensor and operating said cooling device when said temperature signal is above a minimum temperature limit.

[c16] A system as in claim 15 wherein said cooling assembly comprises:
a heat sink thermally coupled to said light source;
an air sleeve thermally coupled to said heat sink; and
a cooling fan thermally coupled to said air sleeve;
said controller operating said cooling fan when said temperature signal is above said minimum temperature limit.

- [c17] A vision system as in claim 11 wherein said receiver assembly filters said at least a reflected portion to correspond with an operating range of said light source.
- [c18] A vision system as in claim 11 wherein said illuminator assembly comprises a plurality of LEDs performing color mitigation.
- [c19] A method of thermally controlling operating range of a light source of a vision system comprising:
generating a temperature signal in response to temperature of the light source; and
heating the light source when said temperature signal is below a maximum temperature limit.
- [c20] A method as in claim 18 further comprising cooling the light source when said temperature signal is above a minimum temperature limit.
- [c21] A method as in claim 19 wherein cooling the light source comprises maintaining an operating wavelength of the light source to correspond with a filter range of a corresponding receiver.
- [c22] A method as in claim 18 wherein heating the light source comprises maintaining operating wavelength of the light source to correspond with a filter range of a corresponding receiver.

